

MUIR'S RAILLARDELLA

Raillardiopsis muirii (A. Gray) Rydb.

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Management status: Federal: BLM Sensitive
California: S2.3, G2 (CDFG, 1998)
CNPS: List 1B, R-E-D Code 2-1-3 (Skinner and Pavlik, 1994)

General Distribution:

Muir's Raillardella is a California endemic known from approximately 19 populations on granitic exposures or granitic soils of the southern Sierra Nevada Mountains in Fresno, Tulare and Kern Counties, with one disjunct population on Ventana Double Cone in the Santa Lucia Range of Monterey County (Baldwin and Kyhos, 1990; Skinner and Pavlik, 1994). With the exception of the disjunct population on Ventana Double Cone and the three southern populations of Muir's Raillardella (Baker Point, Church Dome, and Owens Peak), the species is restricted to the drainages of the Kings and Kaweah Rivers in the Sequoia and Sierra National Forests and Kings Canyon National Park (Baldwin and Kyhos, 1990).

Distribution in the West Mojave Planning Area:

The one WMPA population of Muir's Raillardella occurs in the Owens Peak Wilderness Area on the northeastern slope of Owens Peak at approximately 8000 ft. (2440 m) (Baldwin, pers. com., 1997).

Natural History:

Muir's Raillardella was first described by Asa Gray in 1876 from a collection sent to him by John Muir. Unfortunately, this specimen's label gives only a vague locality: "the Sierras in vicinity of Yosemite." The most northerly known populations of Muir's Raillardella are in the Kings River drainage and Muir explored that area in 1873 and 1875, including the North Fork of the Kings River and the "Yosemite of the Middle Fork of the King's River" - Tehipite Valley (Baldwin and Kyhos, 1990). Large populations of Muir's Raillardella are known to occur here and it seems highly probable that this was the locality of Muir's original collection. After Muir's collection, Muir's Raillardella slipped into obscurity with no additional collections made for 30 years. In August 1905, Alice Eastwood rediscovered Muir's Raillardella along the walls and floor of Tehipite Canyon (Eastwood, 1907).

Muir's Raillardella is a caespitose or mat-forming perennial that grows to approximately 7.5-12 in. (2-3 cm) tall from a branched woody rhizome or caudex (Munz, 1959; Baldwin, 1993b). The glandular-hairy stems support leaves that are opposite on the lower half of the stem and then graduate to alternate on the upper half. This character separates *Raillardiopsis muirii* from *Raillardella argentea* and *R. scaposa*, two allied and similar perennial species with mostly basal leaves, also found in the Sierra Nevada Mountains (Baldwin, 1993a; 1993b). The heads, with only disk flowers, are arranged in groups of 1-3 in a sparse inflorescence, which appears from early June to early October (Munz, 1959; Baldwin and Kyhos, 1990). Flowering occurs

most frequently in July and August (Munz, 1959; Skinner and Pavlik, 1994). Muir's Raillardella has a strongly self-incompatible breeding system requiring pollen from another individual to set viable seed (Baldwin and Kyhos, 1990).

The species appears highly resistant to insect attack and it may be that its restriction to a few limited habitats is due to an inability to compete for light and nutrients with other plant species. It appears that its present rarity cannot be due to herbivory by insects. For example, in a note to A. Sanders (1998), Bruce Baldwin said: "I've grown *R. muirii* in a few different greenhouses and it's amazingly repellent to any insects. During all of the outbreaks of aphids, mealy bugs, and white flies I've seen overwhelming other tarweeds, *R. muirii* is untouched. The plant seems to be bulletproof to any herbivores. It's rarity must be based on lack of ability to compete with other plants."

Habitat Requirements:

Muir's Raillardella occurs on semi-barren granitic outcrops or soils derived from granitic substrates in openings of lower and upper montane forests and chaparral between 3200 and 8000 ft. (1000-2440 m) in elevation. Although restricted to granitic substrates the species has no mineralogical requirement for granitic soils based on successful cultivation in non-granitic mixes (Baldwin and Kyhos, 1990). The species' occurrence in sites with little plant cover may reflect secondary restriction to habitats with reduced competition (Baldwin and Kyhos, 1990). The population on Owens Peak occurs on open granitic ledges and granitic soils at 8000 ft. (2440 m), the highest known occurrence of Muir's Raillardella (Baldwin, pers. com., 1997). The habitat of Muir's Raillardella on Owens Peak is openings within park-like "mixed conifer series" (Sawyer and Keeler-Wolf, 1995) or "mixed conifer forests" (Holland and Keil, 1995) that includes Jeffrey Pine (*Pinus jeffreyi*), Limber Pine (*P. flexilis*), Singleleaf Pinyon (*P. monophylla*), Sugar Pine (*P. lambertiana*), White Fir (*Abies concolor*) and Sierra Juniper (*Juniperus occidentalis* ssp. *australis*). Several other sensitive species occupy the Owens Peak area with Muir's Raillardella, such as Needles Buckwheat (*Eriogonum brendlovei* var. *shevockii*), Sweet-smelling monardella (*Monardella beneolens*), Nine-mile Canyon Phacelia (*Phacelia novemmillensis*), Hall's Daisy (*Erigeron aequifolius*) and Owens Peak Lomatium (*Lomatium shevockii*).

Threat Analysis:

The populations of Muir's Raillardella have several characteristics of a low risk threatened species, including a relatively wide distribution, many populations occurring on National Forests and National Park lands, and habitat consisting of rugged, isolated localities. Although these factors do offer protection for many Muir's Raillardella populations, other populations face potential threats that need to be addressed. Several populations of Muir's Raillardella do not occur within Wilderness Areas. These populations have the potential to be impacted by logging, grazing and maintenance activities in these areas. The population on Baker Point, although on Sequoia National Forest land, does not have the protection of being in a designated wilderness area. Development activities on and around the Baker Point lookout by the Forest Service could have a detrimental impact on this population (Baldwin, pers. com., 1997). Populations occurring along the McKinley Grove Road through the north fork of Kings Canyon could suffer serious to catastrophic impacts if the road is widened to increase vehicle flow through the valley (Baldwin, pers. com., 1997). Populations in Tehipite Valley of Kings Canyon National Park, although not directly trailside, have a high threat of human trampling if visitors stray from the designated trail

routes (Baldwin, pers. com., 1997), but the area is not heavily visited (S. Boyd, pers. comm., 1999). The Owen's Peak population of Muir's *Raillardella* occurs within the Owens Peak Wilderness Area, thus offering protection from threats such as grazing and logging. This population, although isolated from outside pressures by the Owens Peak Wilderness Area, may be exposed to low level threats from hikers due to its presence in the wilderness area.

The need of Muir's *Raillardella* for open habitat means that another possible threat comes from the closure of nearby forest canopies due to fire suppression and the corresponding accumulation of leaf litter. This may lead to mortality of nearby Muir's *Raillardella* plants due to burial in litter (Baldwin, pers. com., 1997).

Biological Standards:

All known populations of Muir's *Raillardella* outside of designated Wilderness Areas should be protected from potentially adverse human activity. The remoteness of many of the Muir's *Raillardella* populations, including the Owens Peak population, and the ruggedness of the occupied terrain greatly reduce the possibility of habitat destruction by humans, though the populations in Tehipite Valley, Kings Canyon National Park, are perhaps an exception. Even those populations are in an area that does not receive heavy use (S. Boyd, pers. comm., 1999). All populations should be well guarded from possible foot traffic by unwary hikers, but especially those populations in high visitor use areas. Any National Forest management decisions involving the Baker Point lookout should be made with awareness of the population of Muir's *Raillardella* at the site, and should minimize habitat alteration or destruction. Decisions on road maintenance, or expansion of McKinley Grove Road through the north fork of Kings Canyon, need to consider possible disturbance or alteration of Muir's *Raillardella* populations in the area. The suppression of regular fire patterns throughout known Muir's *Raillardella* habitat needs to be addressed to avoid habitat alteration and plant mortality. For the Owens Peak population, Wilderness Area management decisions such as Pacific Crest Trail maintenance, future trail expansion or fire prevention strategies should focus on known Muir's *Raillardella* populations to reduce the risk of habitat alteration or destruction.

Literature Cited

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